

CLAIMS

What is claimed is:

1. A method comprising:

obtaining a barcode comprising two or more tags attached to an organic molecule backbone;

binding the barcode to a target; and

detecting the barcode bound to the target.
2. The method of claim 1, wherein the backbone comprises at least one molecule selected from the group consisting of a nucleic acid, a peptide, a polysaccharide, a bio-polymer and a synthetic polymer.
3. The method of claim 2, wherein the nucleic acid is single-stranded DNA.
4. The method of claim 2, wherein the backbone comprises a nucleic acid covalently linked to a peptide.
5. The method of claim 1, wherein the tag is selected from the group consisting of nucleic acids, nucleotides, nucleotide analogs, base analogs, fluorescent dyes, peptides, amino acids, modified amino acids, organic moieties, Raman tags, quantum dots, carbon nanotubes, fullerenes, submicrometer metal particles, electron dense particles and crystalline particles.
6. The method of claim 1, wherein the backbone comprises one or more branched nucleic acids.

7. The method of claim 6, wherein the branches are located at predetermined sites along the backbone.
8. The method of claim 1, wherein the barcode is detected by a technique selected from the group consisting of fluorescent spectroscopy, Raman spectroscopy, Fourier transform infrared spectroscopy (FTIR), and surface plasmon resonance.
9. The method of claim 1, wherein the barcode binds to the target via a probe moiety.
10. The method of claim 1, wherein distinguishable barcodes are generated by attachment of the same tag to different sites along the same backbone.
11. The method of claim 1, wherein the target is selected from the group consisting of a protein, a peptide, a glycoprotein, a lipoprotein, a prion, a nucleic acid, a polynucleotide, an oligonucleotide, a lipid, a fatty acid, a carbohydrate, a glycolipid, a phospholipid, a sphingolipid, a lipopolysaccharide, a polysaccharide, a eukaryotic cell, a prokaryotic cell, a bacterium, a phage, a virus and a pathogen.
12. A method comprising:

obtaining a nucleic acid template comprising a container section and a probe section; and

hybridizing one or more tagged oligonucleotides to the container section to create a barcode.
13. The method of claim 12, further comprising binding the barcode to a target.
14. The method of claim 13, further comprising detecting the barcode bound to the target.

15. A method for making a polymeric Raman label comprising:
obtaining two or more monomeric units; and
polymerizing the monomeric units to make a polymeric Raman label.
16. The method of claim 15, wherein each monomeric unit comprises a Raman tag.
17. The method of claim 16, wherein each Raman tag in a single polymeric Raman label is different.
18. The method of claim 16, wherein the Raman tags are attached to the backbone of the polymeric Raman label through spacer moieties.
19. The method of claim 15, wherein Raman tags are attached to the polymeric Raman label after polymerization of the monomeric units.
20. The method of claim 15, further comprising deprotecting a functional group at one end of a monomeric unit and forming a covalent bond between the monomeric unit and the polymeric Raman label.
21. The method of claim 15, further comprising generating subpolymeric units, each subpolymeric unit comprising a predetermined number of monomeric units.
22. The method of claim 15, further comprising attaching the polymeric Raman label to a solid support.

23. The method of claim 22, wherein the solid support is a nanoparticle or bead.
24. The method of claim 15, further comprising attaching a probe to the polymeric Raman label.
25. The method of claim 24, further comprising binding the probe to a target.
26. The method of claim 25, further comprising detecting the probe bound to the target.
27. A polymeric Raman label comprising:
two or more monomeric units covalently attached together;
two or more Raman tags; and
at least one probe.
28. The polymeric Raman label of claim 27, further comprising a nanoparticle or bead attached to the polymeric Raman label.
29. The polymeric Raman label of claim 27, wherein each Raman tag in the label is different.
30. The polymeric Raman label of claim 27, further comprising two or more copies of each Raman tag.
31. A system comprising:
an imaging instrument;
at least one barcode linked to a probe; and

at least one target bound to the probe.

32. The system of claim 31, wherein the imaging instrument is selected from the group consisting of a fluorescent instrument, a Raman instrument, and an FTIR instrument.
33. The system of claim 31, wherein each barcode comprises two or more Raman tags.
34. The system of claim 33, wherein each Raman tag in a single barcode has a different Raman emission spectrum.